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Importation and Transmission of SARS-CoV-2 B.1.1.529 (Omicron) Variant of Concern in Korea, November 2021

Ji Joo Lee,[1*] **Young June Choe**,[2*] **Hyeongseop Jeong**,[3] **Moonsu Kim**,[3] **Seonggon Kim**,[3] **Hanna Yoo**,[3] **Kunhee Park**,[4] **Chanhee Kim**,[4] **Sojin Choi**,[4] **JiWoo Sim**,[5] **Yoojin Park**,[5] **In Sil Huh**,[5] **Gasil Hong**,[5] **Mi Young Kim**,[6] **Jin Su Song**,[6] **Jihee Lee**,[6] **Eun-Jin Kim**,[1] **Jee Eun Rhee**,[1] **Il-Hwan Kim**,[1] **Jin Gwack**,[1] **Jungyeon Kim**,[1] **Jin-Hwan Jeon**,[1] **Wook-Gyo Lee**,[1] **Suyeon Jeong**,[1] **Jusim Kim**,[1] **Byungsik Bae**,[1] **Ja Eun Kim**,[7] **Hyeonsoo Kim**,[7] **Hye Young Lee**,[1] **Sang-Eun Lee**,[1] **Jong Mu Kim**,[1] **Hanul Park**,[1] **Mi Yu**,[1] **Jihyun Choi**,[1] **Jia Kim**,[1] **Hyeryeon Lee**,[1] **Eun-Jung Jang**,[1] **Dosang Lim**,[1] **Sangwon Lee**,[1] **and Young-Joon Park** [1]

[1]Korea Disease Control and Prevention Agency, Cheongju, Korea
[2]Korea University Anam Hospital, Seoul, Korea
[3]Incheon Metropolitan Government, Incheon, Korea
[4]Gyeonggi-do Infectious Disease Control Center, Suwon, Korea
[5]Seoul Metropolitan Government, Seoul, Korea
[6]Capital Regional Center for Disease Control and Prevention, Seoul, Korea
[7]Incheon Airport National Quarantine Station, Incheon, Korea

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Address for Correspondence:
Young-Joon Park, MD, MPH
Korea Disease Control and Prevention Agency, 187 Osongsaengmyeong 2-ro, Osong-eup, Heungdeok-gu, Cheongju 28159, Korea.
E-mail: pahmun@korea.kr

*Ji Joo Lee and Young June Choe contributed equally to the manuscript.

ORCID iDs
Ji Joo Lee
https://orcid.org/0000-0002-2850-3406
Young June Choe
https://orcid.org/0000-0003-2733-0715
Hyeongseop Jeong
https://orcid.org/0000-0001-9688-3378
Moonsu Kim
https://orcid.org/0000-0002-9996-4533
Seonggon Kim
https://orcid.org/0000-0003-3606-6784
Hanna Yoo
https://orcid.org/0000-0002-6435-935X
Kunhee Park
https://orcid.org/0000-0001-6691-4735
Chanhee Kim
https://orcid.org/0000-0003-0441-4107

ABSTRACT

In November 2021, 14 international travel-related severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) B.1.1.529 (omicron) variant of concern (VOC) patients were detected in South Korea. Epidemiologic investigation revealed community transmission of the omicron VOC. A total of 80 SARS-CoV-2 omicron VOC-positive patients were identified until December 10, 2021 and 66 of them reported no relation to the international travel. There may be more transmissions with this VOC in Korea than reported.

Keywords: Coronavirus; COVID-19; SARS-CoV-2; Omicron Variant

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) B.1.1.529 omicron variant of concern (VOC) was first reported on November 24, 2021 in South Africa, and has quickly spread globally.[1] The first two patients infected with omicron VOC in South Korea was identified on November 25, 2021, during the screening of inbound international travelers at the airport. Herein, we describe the omicron VOC prevalence over time and epidemiological and clinical characteristics of the confirmed patients.

Details of the surveillance system have been described earlier.[2] Public health officers interviewed patients about demographics, vaccination history, and symptoms. In all cases and contacts, nasopharyngeal swab specimen was collected for reverse transcriptase polymerase chain reaction (RT-PCR) tests. Incubation period was calculated from time of

Sojin Choi
https://orcid.org/0000-0003-4037-4683
JiWoo Sim
https://orcid.org/0000-0001-8213-6160
Yoojin Park
https://orcid.org/0000-0002-1602-8222
In Sil Huh
https://orcid.org/0000-0001-7939-8565
Gasil Hong
https://orcid.org/0000-0001-7537-3424
Mi Young Kim
https://orcid.org/0000-0003-0441-3948
Jin Su Song
https://orcid.org/0000-0003-0050-8018
Jihee Lee
https://orcid.org/0000-0002-0820-357X
Eun-Jin Kim
https://orcid.org/0000-0001-6784-8004
Jee Eun Rhee
https://orcid.org/0000-0001-8008-6964
Il-Hwan Kim
https://orcid.org/0000-0003-3566-5523
Jin Gwack
https://orcid.org/0000-0003-0932-9542
Jungyeon Kim
https://orcid.org/0000-0003-2732-1544
Jin-Hwan Jeon
https://orcid.org/0000-0002-5775-4108
Wook-Gyo Lee
https://orcid.org/0000-0002-3765-6391
Suyeon Jeong
https://orcid.org/0000-0002-8973-6633
Jusim Kim
https://orcid.org/0000-0001-7730-8474
Byungsik Bae
https://orcid.org/0000-0003-0855-9936
Ja Eun Kim
https://orcid.org/0000-0002-1336-3949
Hyeonsoo Kim
https://orcid.org/0000-0001-5665-5565
Hye Young Lee
https://orcid.org/0000-0002-5367-4637
Sang-Eun Lee
https://orcid.org/0000-0002-2415-9361
Jong Mu Kim
https://orcid.org/0000-0002-5840-6965
Hanul Park
https://orcid.org/0000-0001-9005-9388
Mi Yu
https://orcid.org/0000-0001-5831-1053
Jihyun Choi
https://orcid.org/0000-0002-6547-4691
Jia Kim
https://orcid.org/0000-0003-2989-5533
Hyeryeon Lee
https://orcid.org/0000-0002-6920-2298
Eun-Jung Jang
https://orcid.org/0000-0002-9104-5129

exposure, and the serial interval was estimated based on the time from symptom onset in index cases to symptom onset in corresponding contacts.

During November 24 - December 10, 2021, a total of 80 SARS-CoV-2 omicron VOC-positive patients were identified in Korea (**Table 1**). In total, 14 (17.5%) patients had history of international travels within 14 days of symptom onset, or if asymptomatic, SARS-CoV-2 test results (Nigeria, n = 10; South Africa, n = 2; Mozambique, n = 1; Ethiopia, n = 1, Iran, n = 1; **Fig. 1A**). Among community transmission cases, 26 were from households, and 12 were from church-related clusters (**Fig. 1B**). Among 78 patients with documented history of vaccination, 48 (60.0%) were unvaccinated, and 25 (31.3%) were vaccinated. The vaccinated persons have received BNT162b (n = 13), mRNA-1273 (n = 5), Ad26.COV2.S (n = 4), and ChAdOx1 (n = 3) vaccines (**Table 1**).

Most of the first 80 SARS-CoV-2 omicron VOC-positive patients were with mild symptoms, and 27.5% were asymptomatic, and no cases were with severe diseases nor death during 6.1 mean observed days (range, 2–16 days). Estimated incubation period was 4.2 days (range, 2–8 days) and serial interval was 2.8 days (range, 1–7 days).

Table 1. Characteristics of reported confirmed SARS-CoV-2 B.1.1.529 (omicron) variant of concern cases (n = 80), South Korea, November 24 - December 10, 2021

Characteristics	No. (%) of patients
Age group, yr	
< 20	17 (21.3)
20–39	37 (46.3)
40–59	19 (23.8)
60+	7 (8.8)
Sex	
Male	37 (46.3)
Female	43 (53.8)
International travel history[a]	14 (17.5)
COVID-19 vaccination status	
Unvaccinated	48 (60.0)
Partially vaccinated	5 (6.3)
Vaccinated[b]	25 (31.3)
Symptom profile	
Asymptomatic	22 (27.5)
Symptomatic	58 (72.5)
Initial signs or symptoms	
Fever	19 (23.8)
Chills	14 (17.5)
Cough	26 (32.5)
Sputum	9 (11.3)
Sore throat	28 (35.0)
Headache	19 (23.8)
Myalgia	11 (13.8)
Anosmia/Ageusia	1 (1.3)
Outcomes[c]	
Severe disease	0
Death	0

[a]International travel within 14 days of symptom onset, or if asymptomatic, SARS-CoV-2 test date; (Nigeria, n = 10; South Africa, n = 2; Mozambique, n = 1; Ethiopia, n = 1; Iran, n = 1).
[b]An unvaccinated person had received no COVID-19 vaccine. A partially vaccinated person had received a COVID-19 vaccine but not completed the primary series ≥ 14 days before illness onset or receipt of a positive SARS-CoV-2 test result. A vaccinated person had completed the primary series of COVID-19 vaccine ≥ 14 days before illness onset or receipt of a positive SARS-CoV-2 test result. Vaccinated persons have received BNT162b, n = 13; mRNA-1273, n = 5; Ad26.COV2.S, n = 4, ChAdOx1, n = 3.
[c]6.1 mean observed days (range, 2–16 days).

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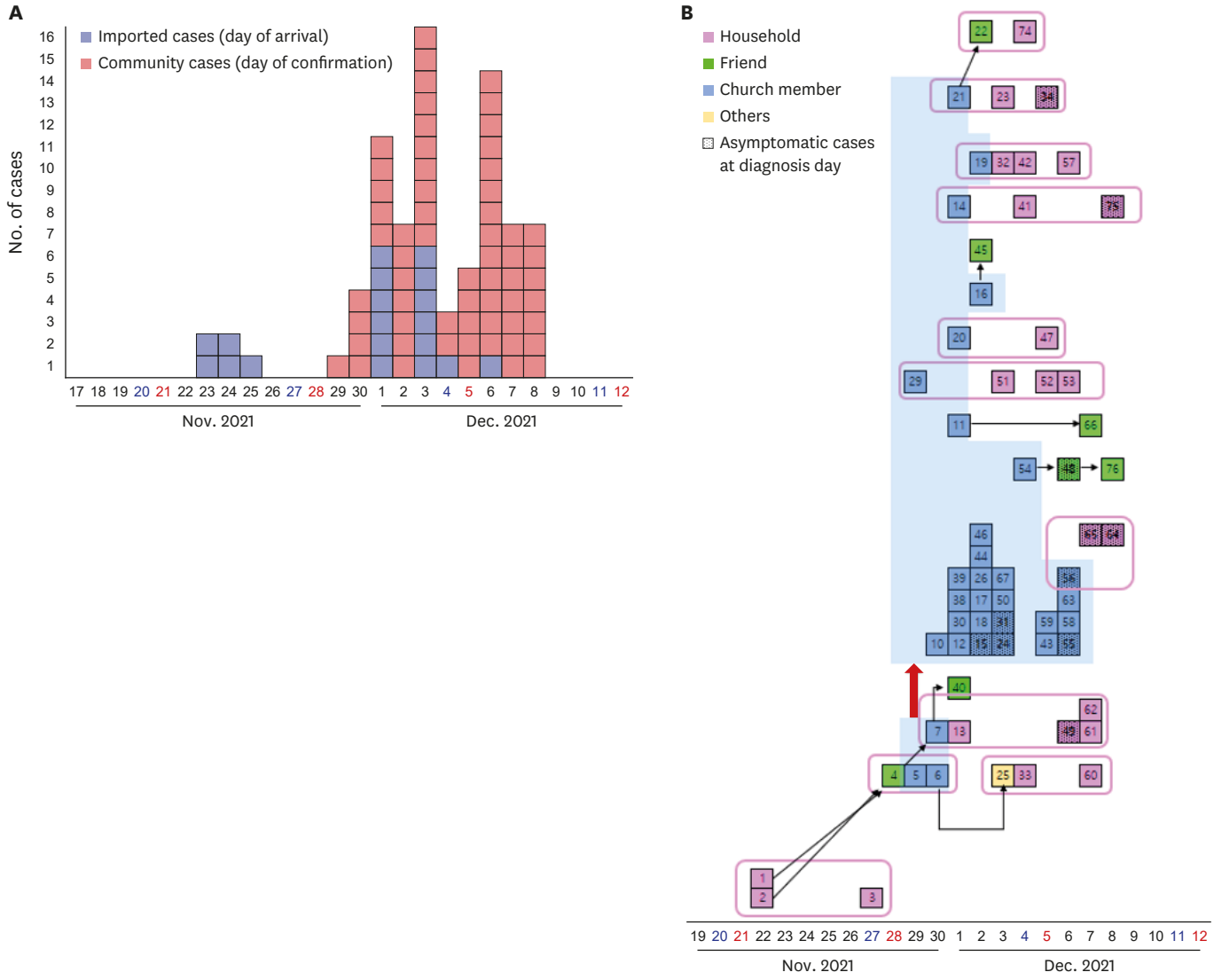

Fig. 1. Chronological distribution of SARS-CoV-2 B.1.1.529 (omicron) variant of concern cases. (**A**) Epidemic curve of reported confirmed cases (n = 80). (**B**) Patterns of community transmission.

Dosang Lim
https://orcid.org/0000-0003-1897-149X
Sangwon Lee
https://orcid.org/0000-0003-0027-0134
Young-Joon Park
https://orcid.org/0000-0002-5971-7829

Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Lee JJ, Lee HY, Lim D, Bae BS. Data curation: Lee JJ, Lim D, Kim M, Kim EJ. Formal analysis: Park K, Kim M, Song JS, Lee S. Investigation: Lee HY, Lee SE, Kim JM, Park H, Yu M, Choi JH, Kim J, Lee HR, Jung JE,

We describe the first 80 patients of SARS-CoV-2 omicron VOC-positive patients identified in South Korea, which have rapidly transmitted to the community in the households and the church. Epidemiologic features of the omicron VOC have not been fully characterized in other places.[3] Our finding of short serial interval of 2.8 days is in line with findings from South Africa, with growing reproductive number compared to the delta VOC.[4] Meanwhile, none of the first 80 patients underwent severe disease or death as in the US, which was reassuring, yet, should be monitored further.[5] The hypothesis of trade-off between virulence and transmissibility has been proposed decades ago, which may be supportive to the evolution of SARS-CoV-2 in the long term.[6]

Note that 60% of omicron VOC-positive patients were unvaccinated, which emphasizes the need for vaccination to limit the transmission. Yet, given the high rates of mutation that omicron VOC carries, vaccine effectiveness should be investigated further.[7] Earlier findings from South Africa suggest the efficacy of coronavirus disease 2019 vaccine may be significantly reduced against omicron VOC.[8]

Jeong HS, Kim Ms, Kim SG, Yoo HN, Park K, Kim C, Choi S, Sim JW, Park Y, Huh I, Hong G, Lee J, Rhee JE, Kim IH, Gwack J, Kim JY, Jeon JH, Lee WG, Jeong SY, Kim JS, Bae BS, Kim JE, Kim HS, Lee S. Methodology: Lee SE, Kim JM, Park H, Yu M, Choi JH, Kim J, Lee HR, Jung JE, Kim Ms, Yoo HN, Choi S, Sim JW, Park Y, Huh I, Hong G, Song JS, Lee J, Rhee JE, Kim IH, Gwack J, Jeon JH, Kim JS, Kim HS. Project administration: Kim C. Resources: Park H, Jeong HS, Kim EJ, Lee WG. Supervision: Choe YJ, Park YJ. Validation: Lee JJ. Visualization: Lee JJ. Writing - original draft: Lee JJ, Choe YJ, Park YJ. Writing - review & editing: Lee JJ, Choe YJ, Park YJ.

Because information about these early cases of SARS-CoV-2 omicron VOC are selected from import-related incidents, our interpretation should be made cautiously. Moreover, given the relatively short observation time, further follow-up is needed to ascertain the disease severity of this specific VOC as more data are reported globally.

In summary, importation of SARS-COV-2 omicron VOC has caused a substantial community transmission in Korea, especially among unvaccinated persons. Although the initial findings on clinical features are reassuring, continuous monitoring of the disease epidemiology and vaccine effectiveness should be in place.

Ethics statement

The present study used the quarantine data which were constructed as a legally mandated public health investigation under the authority of the Korean Infectious Diseases Control and Prevention Act (No. 12444 and No. 13392). The study protocol was reviewed and approved by Institutional Review Board of the Korea Disease Control and Prevention Agency (2021-12-05-PE-A).

REFERENCES

1. World Health Organization. Tracking SARS-CoV-2 variants. https://www.who.int/en/activities/tracking-SARS-CoV-2-variants. Updated 2021. Accessed December 13, 2021.
2. Park YJ, Choe YJ, Park O, Park SY, Kim YM, Kim J, et al. Contact tracing during coronavirus disease outbreak, South Korea, 2020. *Emerg Infect Dis* 2020;26(10):2465-8.
PUBMED | CROSSREF
3. Gu H, Krishnan P, Ng DY, Chang LD, Liu GY, Cheng SS, et al. Probable transmission of SARS-CoV-2 Omicron variant in Quarantine Hotel, Hong Kong, China, November 2021. *Emerg Infect Dis*. Forthcoming 2021. DOI: 10.3201/eid2802.212422.
PUBMED | CROSSREF
4. Callaway E, Ledford H. How bad is Omicron? What scientists know so far. *Nature* 2021;600(7888):197-9.
PUBMED | CROSSREF
5. CDC COVID-19 Response Team. SARS-CoV-2 B.1.1.529 (Omicron) Variant – United States, December 1–8, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70(50):1731-4.
PUBMED | CROSSREF
6. Callaway E. Beyond Omicron: what's next for COVID's viral evolution. *Nature* 2021;600(7888):204-7.
PUBMED | CROSSREF
7. Chen J, Wang R, Gilby NB, Wei GW. Omicron (B.1.1.529): infectivity, vaccine breakthrough, and antibody resistance. *ArXiv*. December 1, 2021. https://arxiv.org/abs/2112.01318.
8. Mahase E. Covid-19: do vaccines work against omicron-and other questions answered. *BMJ* 2021;375(3062):n3062.
PUBMED | CROSSREF